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ABSTRACT

This report describes a pilot distance learning project between Konawaena High School on the Big Island of Hawaii and Brigham Young University-Hawaii on Oahu to begin offering college credit courses to inservice teachers. Ten teachers enrolled in the first class, "Variety in Teaching Methods." Audiographic teleteaching uses a personal computer based system which incorporates computer-generated graphics and text that function like an electronic chalkboard. Computers at host and receive sites are linked over regular telephone lines for two-way visual exchange of text and graphics. Course expenses were higher than expected largely due to the high rate for inter-island telephone toll charges. Nine of the ten teachers completed a questionnaire which posed questions related to the distance learning component of the course. Their responses indicate: (1) high satisfaction with the quality of the course and with the manner in which it was delivered; (2) preference was given to on-site professorial instruction over audiographic teleteaching, yet audiographics was viewed as a very valid and acceptable supplement; (3) an interest in receiving more college credit inservice courses; (4) a need for library materials to support classes; and (5) the computer screen was too small for teachers to easily view when receiving instruction via audiographics. (KS)

DISTANCE LEARNING IN HAWAII: ESTABLISHMENT AND EVALUATION OF A RURAL TEACHER INSERVICE TRAINING PROGRAM

Paper Presented at the 83rd Annual Conference of the
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DISTANCE LEARNING IN HAWAII: ESTABLISHMENT AND EVALUATION OF A RURAL TEACHER INSERVICE TRAINING PROGRAM

In early February, 1991 the Distance Learning and Technology office of the State Department of Education (D.O.E.) endorsed a pilot distance learning project between Konawaena High School on the Big Island of Hawaii and Brigham Young University-Hawaii on Oahu to begin offering college credit courses to inservice teachers. Course delivery has been via a mix of on-site visits by professors flying from Oahu to Kona and via audiographics teleteaching, using regular telephone lines as the communications link.

This report is a self evaluation of the project's first course which was offered from January to March 1991. The information which follows addresses: (1) background information describing the project, (2) a brief description of audiographics, (3) equipment and software needs, (4) program costs, (5) opinions of participating teachers as to project strengths and weaknesses, (6) general observations, and (7) conclusions and recommendations.

Background Information

Since September 1989, selected Education faculty members at BYU-Hawaii have investigated different audiographic software packages. In February 1990, TSN Systems of Boiling Springs, Pennsylvania awarded BYU-Hawaii with a $9600 grant in software and equipment to pilot the use of TSN's audiographic software in Hawaii. Subsequently, the University purchased $4000 in computer equipment for the express purpose of supporting a distance learning outreach effort using audiographics as the telecommunications medium.

During the 1990 school year, several contacts were made between BYU-Hawaii faculty and D.O.E. Distance Learning and Technology (DLT) personnel to discuss possible implementation of a pilot project using audiographics. In September 1990, initial contact was made by Bruce Barker, a professor at BYU-Hawaii with Mae Yamasaki and James Dumaguin, the principal and vice principal at Konawaena High School, and with Brian Nakashima, Deputy District Superintendent for the Big Island. Interest was shown on the part of Big Island school administrators for BYU-Hawaii to offer relevant college credit inservice courses to interested teachers in the Kona area. Teachers could enroll for courses to improve skills and to earn credits to apply toward salary increases on the state D.O.E. teacher salary schedule.

An inquiry of computer hardware available at Konawaena High School determined that an IBM PS-2 model 30 as well as a Tandy TL2 1000 with a 40 megabyte hard disk and RGB monitor could be used for potential audiographiics linkage with BYU-Hawaii. With assistance from Mr. Gilbert Kaneko, Konawaena High School distance learning coordinator, TSN audiographics software was tested on both machines in December 1990 and January 1991. The tests proved successful. A short proposal was then drafted and submitted to DLT staff at the D.O.E. requesting that the D.O.E. (1) provide funds or make available to Konawaena High School a facsimile machine, (2) provide funds to purchase TSN telecommunications software and a graphics tablet for use at Konawaena High School, (3) fund BYU-Hawaii to conduct a self evaluation of the project, and (4) authorize BYU-H to use a classroom at Konawaena High School at no cost or low cost in terms of classroom rental.

The first class to be offered (three semester credit hours) was entitled "Variety in Teaching Methods." Flyers advertizing the course were prepared and delivered to teachers in early December at each of eight public schools on the Kona coast (Kealakehe, Kahakai, Holualoa, Konawaena, Honaunau, and Hookena Elementary Schools; and Kealakehe Intermediate School and Konawaena Intermediate and High School). A total of 10 teachers enrolled.

Course registration was coordinated through the Division of Continuing Education at BYU-Hawaii. Student tuition was set at $60 per semester hour; $180 for the three semester hour course. The class was team taught by BYU-Hawaii professors Bruce Barker and Keith Burnett over a five week period from January 25 to March 2. Classes met on selected Wednesdays, Fridays, and Saturdays. This included three Friday evening classes (4:00-7:00 pm), three Saturday classes (8:00 am -12:00 noon and 1:00-4:00 pm), and five Wednesday classes (4:00-6:00 pm). One of the two professors traveled on-site for each of the three Fridays and Saturdays that classes were held. One of the five Wednesday night classes was taught by an on-site professor, the other four were taught from BYU-Hawaii using the audiographics technology. Hence, of the 40 contact hours which the class met under the direction of a professor, 32 hours were taught with a professor on-site (three Fridays @ 3 hours each, three Saturdays @ 7 hours each, and one Wednesday @ 2 hours) and eight hours were taught in a distance learning mode using audiographics (four Wednesdays @ 2 hours each). The first two formal class meetings were taught on-site. This permitted opportunities for rapport setting with class members before use of the computers in a distance learning mode.

Description of Audiographic Teleteaching

Microcomputer aided audiographic teleteaching can be briefly described as a personal computer (PC) based system which incorporates computer-generated graphics and text that function much like an electronic chalkboard. The system requires specially designed telecommunications software that has been produced by several vendors for Apple, Macintosh, and MS-DOS microcomputers. The telecommunications software allows the user to create computer graphics and multi-sized text called "slides" which can then be transmitted in real time from one machine to another. Once on-line with other compatible PCs, the system operates on a "common screen" basis -- that is, whatever graphic or textual material (slide) is executed from the host screen/monitor (location) automatically shows up on all the other screens (distant locations) simultaneously. Visual exchange of slides is in a still-frame mode. Motion is not possible.

Computers at host and receive sites are linked over regular telephone lines for two-way visual exchange of text and/or graphics. Two-way audio interaction between the teacher and students at distant sites is via speaker telephones, also over regular telephone lines. Addition and use of a facsimile machine permits hard copy exchange of instructional handouts and/or student written work.

Equipment and Software Requirements

As noted earlier, four class sessions of two hours length each were delivered from BYU-Hawaii to Konawaena by means of an audiographics link between the two sites. The personal computers (an IBM PS-2 model 30 at BYU-Hawaii and an IBM PS-2 model 30 at Konawaena) were both connected via modem over regular telephone lines. Speaker telephones between the two sites were connected by a second telephone line. Student handouts and printed materials used in the distance learning component of the course were sent via facsimile from BYU-Hawaii prior to the Wednesday evening classes. Once the faxed handouts were received at Konawaena, copies were made for class members.

Specific hardware and software items used at the host site (BYU-Hawaii) for the distance learning component of this project included:

- One IBM PS-2 Model 30 personal computer with EGA monitor and 30 megabyte hard disk; approximate value, $1500.

- Practical Peripherals 2400 baud external modem; approximate value, $150.
- Radio Shack DuoFone model 102 speaker telephone; approximate value, $45.
- Sharp FO- 215 facsimile machine; approximate value, $1400.
- TSN Systems Computer Aided Teaching audiographics software, version 1.1; approximate value, $950.
- Access to two regular dial tone telephone lines.

Konawaena High School provided a microcomputer and modem. The DLT office either made available or provided funds to acquire a facsimile machine, speaker telephone, telecommunications audiographic software, and access to two phone lines. Specific hardware and software used at Konawaena High School for the distance learning component of the course included:

- One IBM PS-2 Model 30 personal computer with EGA monitor and 30 megabyte hard disk; approximate value, $1500. This machine was used for the first course. During March through May a second course was taught. A Tandy TL2 1000 microcomputer with an RGB monitor and 40 megabyte hard disk was used for the second course; approximate value, $1300.
- Robotics 2400 baud external modem; approximate value, $150.
- Lanier Fax Writer 3230 facsimile machine; approximate value, $1300.
  - Luma video/speaker telephone (model LU-1000); approximate value, $350.
  - TSN Systems Computer Aided Teaching audiographics software, version 1.1; approximate value, $950.
  - Access to two regular telephone lines.

Project Costs

At the initiation of this project, BYU-Hawaii agreed to the following:

1. Provide all required equipment and software at the host site (BYU-Hawaii campus).
2. Pay all telephone toll charges associated with the distance learning component of the course.
3. Provide technical assistance in setting up the TSN Systems Computer Aided Teleteaching audiographic system at Konawaena High School at no charge to the school.
4. Begin the delivery of college credit inservice courses to teachers on the Kona coast of the Big Island at a tuition rate that is competitive with other higher education institutions in the state.
5. Pay all costs for faculty travel to teach the course on-site. Also, to pay the faculty stipend for courses taught in Kona.

Konawaena High School, with assistance from DLT, provided for all equipment and software requirements at the Big Island site. In addition, it was agreed that no charge for classroom rental would be made to BYU-Hawaii to teach the class on the Konawaena campus.

The course was offered through the Division of Continuing Education at BYU-Hawaii. It was hoped that income received from student tuition would cover a large part of the course expenses. This was not the case. Actual course expenses exceeded income by an alarming $2615. The loss was covered by BYU-Hawaii. A summary listing of income and expenses directly related to the course shows:

Income

1. Individual registration fee set at $180 for the three credit hour course ($60 per credit hour).
2. 10 students registered. Therefore, **actual total income =** **$1800**

Expenses

1. Professor stipend to teach the course (split between two professors) $2040	
2. Continuing Education administration fee.	250
3. Travel, lodging, per diem, and car rental expense for faculty to travel on site to teach the course, etc.; 3 roundtrip air flights @ $78 each; 3 nights lodging @ $60/night; 3 car rentals @ $20 each, four and one-half days of per diem @ $26/day; milage to airport and parking, 3 trips @ $28/trip)	675
4. Telephone toll charges to teach via distance learning ($1.45 per minute x 4 sessions x 2 phones=1276)	1276
5. Telephone toll charges to download computer data/slides ($1.45 per minute x 4 connections x 15 minutes x 2 phone lines=174)	174
Actual Total Expenses=	**$4385**
Difference between expenses and income	**(-$2615)**

Explanation of Expenses

As a pilot project, it was anticipated that the program would not be cost effective the first time that a course was offered. We fully expected start up costs of $500 to $800 beyond earned income, and were willing to accept this as a necessary factor for program development. About $900 in excess funds, earned from earlier inservice training, was purposely held in reserve to cover our anticipated loss. It was far from enough.

We expected that the telephone linkages via audiographics would be a significant factor in reducing course delivery costs. Prior to teaching the class, contact was made with Hawaiian Telephone Company. It was learned that inter-island calls during prime time were billed at roughly $.40 per minute. We were shocked to see our phone bill -- received one month after the course ended -- and learn that billing was actually made at $1.45 per minute!

Since two telephone lines are required (one for computers to "talk" to each other, and one for student/instructor audio interaction via speaker phone), the actual cost is doubled. After receipt of a telephone bill for $1450, we investigated and found that the University's internal telephone service was unable to connect direct dial calls (calls made by professors in their offices using touch tone phones directly to parties on neighbor islands) at the Hawaiian inter island rate of $.40 per minute.

The general procedure for inter-island calls originating from BYU-Hawaii is for professors to ring the University's internal telephone exchange and ask the exchange to "place" the call. Instead, calls from professors' offices via audiographics were dialed directly to Konawaena. We did this because it was more convenient that going through an "operator." Direct dialing from professors' offices caused the calls to be routed all the way to the U.S. Mainland, then returned to Hawaii. Since the routing was over such a long distance and was not on a WATTS service or through Hawaiian Telephone, the billing costs skyrocketed. In fact the average expense for a professor's

visit on site was $213. In comparison, the average costs for an audiographics class was $362.50 (110 minutes of instruction plus 15 minutes of download time; therefore, 125 minutes x $1.45/minute x 2 phone lines). At a costs of $1.45 per minute, the audiographics classes were significantly more expensive than the cost of flying professors on-site. See Figure 1.

It should be noted that the on-site visit was for a duration of 10 classroom contact hours; the audiographic connection was for two classroom contact hours.

Figure 1

Average expense per visit to fly and lodge instructor at Kona to teach class on site	$213.00
Average telephone cost @ $1.45/minute toll call to conduct audiographics class for about two hours	$362.50

If toll calls had been billed at $.40 per minute, as initially expected, costs to deliver course content by means of audiographics would have been much less. See Figure 2. For example, at $.40 per minute the average cost for a 110 minute audiographics class with 15 minutes allowed for data download would have been $100 (125 minutes x $.40/minute x two phone lines), a $162.50 savings from the actual toll charges and a $113 savings from flying and lodging a professor at Kona.

Figure 2

Average expense per visit to fly and lodge instructor at Kona to teach class on site	$213.00
Average telephone cost @ $.40/minute toll call to conduct audiographics class for about two hours	$100.00

Participant Perceptions of Program Strengths and Weaknesses

Ten teachers enrolled in the course. Seven taught at Konawaena High School, two at Honaunau Elementary and one at Kealakehe Elementary. All were experienced classroom teachers. The sex breakdown was two male and eight female. Three of the 10 teachers were simultaneously enrolled in an evening course offered by University of Hawaii @ Hilo and delivered via the Hawaii Interactive Television System (HITS) broadcast to the UH-Hilo receive facility in the Kealakekua shopping center near Kailua, Kona.

Nine of the ten teachers completed a 20 item self-administered questionnaire which posed questions related to the distance learning component of the course. Fourteen questions required Likert type responses on a five point scale where "1" meant "strongly agree" and "5" meant "strongly disagree." Six questions allowed for open ended responses.

Due to the small number of students in the class, responses from the Likert questions are reported in terms of number of responses (1) agreeing with the statement, (2) neutral in their feelings to the statement, or (3) disagreeing with the statement. Likert questions from the survey and a

compilation of participant responses follow:

1. Instruction taught over the computer and speaker telephone kept my interest. *8 agree; 1 neutral.*
2. I took more written notes during the distance learning portion of the course that I did during the on-site visits by the instructors. *5 agree; 4 neutral.*
3. Distance learning visuals were easy to see and to understand. *7 agree; 2 neutral.*
4. The teacher's voice over distance learning was usually easy to hear and to understand. *9 agree.*
5. Instruction via distance learning was overall well organized and easy to follow. *9 agree.*
6. I felt comfortable asking questions or making comments during the distance learning component of the course. *9 agree.*
7. The instructor made me feel a part of the class and comfortable during the distance learning component of the course. *9 agree.*
8. Interaction between instructor and students (questioning and comments) was at an equal or better level during the distance learning aspect of the course as it was during on-site visits by instructors. *6 agree; 1 neutral; and 2 disagree.*
9. Learning via distance learning was a positive experience for me. *8 agree; 1 neutral.*
10. "Time on task" for the class was as good during distance learning as it was during on-site instruction. *6 agree; 3 neutral.*
11. The distance learning technique use was an effective way to learn. *9 agree.*
12. I would like to take additional college credit courses that have on-site visits by "traveling professors" mixed with distance learning by computer and speaker telephone. *9 agree.*
13. I feel a person can learn as much via the distance learning approach as they can in an on-site teaching approach. *7 agree; 2 neutral.*
14. Compared with regular classroom instruction, the distance learning component required much more attention on the part of the students. *7 agree; 2 neutral.*

Each of the nine respondents provided somewhat detailed written comments to the six opened questions. Five students said that "instruction via distance learning -- as used in this course -- was as effective as regular classroom instruction." Four said it was "less effective." When asked to explain or justify their answer, those who said it was "as effective" wrote:

- In consideration of the initial technological problems, it's apparent that both can be effective; during this course I sometimes found one more effective than the other, but generally they balanced.
- I felt as effective since we had already met both instructors and were able to understand where they were "coming from," but it would be better to have people in person.
- It really didn't matter what method of instruction was used. The key was who the instructors were. The rapport was great.
- I felt the distance learning was very effective except for the personal interaction you miss.
- The classroom instruction gave us the "instructor as model" component, but I was drawn to the experience of distance learning; one complements the other.

On the other hand, those who said if was "less effective" justified their reasoning as follows:

- Less, but only by a little because of the "glitches" in the technology; we have been talking about ways to improve which should probably prove very fruitful; the personalities of the instructors made a lot of difference.
- Sometimes things moved a little too slow -- more handouts of things listed, more fluidity of graphics and better quality telephone speakers might help; also, video to go with lesson could bring it closer.
  Obviously, one-to-one in person is more effective, but my experience with the distance

learning was positive.
- I get more out of face-to-face interaction with the instructor.

Other open ended questions are listed below in bold faced format. Exact written responses from students are compiled beneath each open ended question.

Question: **How important is it to you that college credit courses be delivered at or near the school where you teach? (That is, is it important that a program/courses be delivered to you by traveling professors and distance learning technologies rather than have you travel to courses taught in residence on a college campus).**

- It is very important. The time element and the expense are the main factors.
- It is very important to have the program/course delivered here. With a family, its very difficult to be away for long periods of time or housing becomes a problem. It was convenient and easier to make the time and effort.
- Yes!!! It made it very convenient and enjoyable.
- It is very important especially during the school week. Driving long distances, in addition to spending all day in a class is extremely draining.
- It is a necessity. It is very difficult and expensive for me to find anyone to take care of my home responsibilities so I am not able to leave to take courses.
- I would like the class delivered to my home
- Extremely (I don't have family in Honolulu).
- VERY!!! When we're teaching 5 days a week, and grading and planning every weekend, traveling to courses is next to impossible.
- Very important! It is a morale booster as well as a pragmatic, energy saving opportunity.

Question: **What did you like best about the distance learning component of this course?**

- It's right here; reachable; readily accessible. From its initial stages, I think it went very well.
- It eased the load on the prof's and made it possible to (1) offer the course to us in the first place, and (2) complete the courses in as compact a time as possible.
- The interaction/humor. The direct teaching method works well on the monitor.
- Delivery on campus to a close group.
- It led to very well organized information. It was very easy to follow the point and to take notes.
- It was nice to get to know the instructors before we started the distance learning. It made the distance learning a more personal experience. Having read about this technique, it was interesting to be a part of it.
- Having the materials in front of you as it was being discussed.
- It was a totally new way of learning for me. It was very helpful to meet the instructors first before starting on the computer.
- The teachers. I think it made a lot of difference. And that we were lucky enough and able to have 2 different and enjoyable personalities was really appreciated. The personalities in the class were fun -- everyone was so different.

Question: **What did you like least about the distance learning component of this course?**

- The occasional problems with the technology -- however, they were surmountable.
- I found it more difficult to focus.
- Trying to read the monitor during the first distance learning session.
- I think I would prefer an individual terminal with some thought provoking, individual assignment, along with group instruction, of course.

- Course meeting on a Wednesday, Friday, and Saturday of the same week -- very stressful.
- Can't think of anything negative except there was no one to keep everyone on task.
- The graphics at times were very difficult.
- Sometimes the computer learning was hard to see and hear, but we're sure they'll improve and we were happy that we had the chance to be a part of it. It was learning for us too!

Question: **What do you think are key factors to help ensure learning via distance learning?**

- Reliability of the system(s) technology; initial in-person orientation helps (though not absolutely necessary); if possible a video hook-up would help both instructor and students.
- Larger screen; speaker phone that picks everything up; we just plain need to get used to the fact that we must speak our answers; head nods and eye agreements and smiles are hard to hear!
- Keeping the class to a small group that you can interact with.
- Personal exposure, at least initially, to live instructors and live group; interaction with groups on other islands could be beneficial if not revolutionary.
- Attitude of students toward being attentive.
- If using only one computer, keeping the class small enough so that everyone can see and be involved.
- The instructors.
- Keep topics of great interest for the distance learning and use topics in person that need to be "visual."
- Keep it going -- the warmth of the instructors was felt and contagious. We appreciated the effort and want to keep it on-going.

Question: **What suggestions would you make to improve this experience in the future?**

- Individual terminal access; audio system improvement -- easier for everyone to speak and be heard by instructor; need resource library (set-up here) that includes bibliography plus key literature for background readings; reproducible teaching materials would help, too.; fax connections for transmission of lesson assignments.
- Pretty much getting the technology improved a bit; also, handouts to us well before class would speed up the whole thing.
- More monitors; better speaker phone; do a video for the story telling content of the course.
- Enlarge the viewing screen or arrange for multiple terminals.
- Use some videos to demonstrate techniques or even short lectures.
- Have handouts and reading material available before the class.
- Some materials that were used on the computer could be replaced by on-site teaching.
- Use a larger screen or more computer terminals; overall it was a new learning experience.
- Bigger screen -- hopefully; as someone said, it could be extended to where there would be a satellite where we could have persons here to teach all the time; we are crying for attention!

General Observations

Two general items of concern should be noted that related directly to the distance learning component of this course.

The telephone lines into the computer lab at Konawaena High School (where the course was

taught) were replaced during the week of March 4 -- just after the course ended. Upgraded lines were "tone" whereas the replaced lines were "pulse." This is mentioned because during one of the audiographic classroom sessions, it was not possible to "connect" the computers together to form an interactive network between the host machine at BYU-Hawaii and the receive machine at Konawaena. It may have been that the phone lines were particularly busy or "noisy;" or perhaps there was some other sort of interference on the lines. In any event, the computers did not properly connect or "talk" to each another. Yet, the following day, they worked perfectly fine. This caused considerable frustration on the part of BYU-Hawaii professors. According to TSN Systems' (the software vendor), the fault lay with the fact that pulse telephone lines were particularly inefficient to use for data transmission between computers. Whatever the reason, during one of the four audiographics sessions, we experienced a technical failure. According to the vendor, this should not have happened. When the failure did occur, the vendor tried to place blame on factors unrelated to the software.

The second item of concern has to do with the transmittal of assignments or handouts between professor and students while conducting the class in the audiographics mode. The facsimile machine was not set up at Konawaena until about half way into the course. On one occasion, several pages of printed material (handouts) were sent from BYU-Hawaii via the U.S. Postal Service to Konawaena fully eight days before they were to be needed by students. The materials did not arrive until three and one-half weeks later.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions: The experiences gained while working with this project, and an analysis of data collected, seem to support the following conclusions:

1. Course expenses were much higher than expected. A billing cost of $1.45 per minute per phone line for each of the two lines needed for audiographic teleteaching caused the distance learning delivery to actually cost more than flying professors and lodging them on site.
2. Distance learning costs are reduced significantly when telephone toll charges drop from $1.45 per minute to $.40 per minute.
3. Teachers participating on the project expressed high satisfaction with the quality of the course and with the manner in which it was delivered. As expected, preference was given to on-site professorial instruction over audiographic teleteaching. Yet, audiographics was viewed as a very valid and acceptable supplement.
4. Kona coast teachers are extremely interested in receiving more college credit inservice courses. This was a unanimous request from teachers participating in this initial course.
5. Most teachers express a need for library materials to support classes delivered via traveling professors and/or distance learning.
6. The computer screen is too small for teachers to easily view when receiving instruction via audiographics. Also, the audio quality of the speaker phone occasionally made hearing difficult.
7. Two hours of instruction via audiographics seems to be about the limit that interest can be maintained with a "distant" class. After two hours, the instructors often felt "drained" and sensed that participants on the other end felt the same way. In order to keep interest, the content must be extremely well organized with visual support on the computer screen and meaningful handouts available for class members. Furthermore, the instructor must exhibit an enthusiasm for the content that is projected to the listeners/viewers at the other end of the phone lines.

Recommendations: Specific items to consider for the future to improve this kind of project include the following:

1. Ways to reduce the cost of course delivery must be explored. Delivery of audiographics at $.40 per minute per telephone line would have saved almost $900.
2. Efforts should be made to increase the number of teachers enrolling in future courses. If telephone toll charges had been $.40 per minute per line, actual program expenses (faculty stipend, travel and per diem, Continuing Education fee, and telephone charges) would have been about $3300. If 19 teachers were enrolled at a tuition cost of $180 each (3 semester hour course @ $60/credit hour), the course would have paid for itself.
3. The screen size for receiving audiographic visuals at the school sites needs to be larger. The possibility of either linking the computer monitor to a large 25 inch TV screen or to an overhead head projector with an LCD viewer needs to be investigated.
4. Instructional content prepared for delivery via audiographics must be well designed and properly sequenced. Computer graphics and text must be visually appealing. The teleteacher needs to articulate clearly and distinctly. Verbal communication must be precise and explicit. Too much teacher talk, especially rambling, will cause confusion and disinterest in this type of a medium.
5. Other audiographics teleteaching software needs to be reviewed. Review of other software may prove to be more reliable, easier to use, or of better quality.
6. Library resource materials need to be made available to teachers. A "box" of books, journal articles, or readings needs to be prepared for each course taught in the future and made accessible to those enrolled in the course. Participants could "check out" materials, then return them when the course ends. Thought might also be given to the development of written modules or self paced learning packets which individual participants could use to supplement course content.

CLOSING REMARKS

The need for college credit inservice training to teachers in rural areas of Hawaii is well recognized. The teachers participating in this pilot project all expressed the need for credit generating classes delivered on-site. One month after this first class, a second three credit hour course entitled "Curriculum Development for Teachers" was offered at Konawaena. Fifteen teachers enrolled. During July and August, 1991, three other credit courses were offered on Big Island; more than 100 teachers enrolled. And, in October 1991, a computer class for teachers began with 18 enrolling for credit. Teachers in rural Hawaii are "hungry" for practical training that improves their skills and which leads to reclassification on the D.O.E. state teacher salary schedule.

Unfortunately college credit course work delivered on-site for teachers in remote settings is limited. Efforts by UH-Manoa and UH-Hilo through HITS is helping to increase opportunities. Undoubtedly HITS will serve as the major vehicle to provide training to neighbor island teachers. Other qualified providers such as BYU-Hawaii, however, can supplement HITS, thereby increasing opportunities for neighbor island teachers as well as giving them a program choice.

For BYU-Hawaii this pilot audiographics project has been a rather costly venture. It has also broadened our understanding and given us new insights on how to deliver "out reach" education. Although the telephone toll charges for the audiographics component were much higher than expected, one item not factored into this cost is the value of professorial time. The audiographics component permitted more frequent contact with the class for briefer time periods than Friday evening and all day Saturday classes. Furthermore, the professors did not have the time "cost" of spending two days away from campus. We maintain a continued interest in looking at audiographics as a distance learning medium and hope to finds ways to reduce program costs yet broaden services to neighbor island teachers.